"Of Gods and Men": Selected Print Media Coverage of Natural Disasters and Industrial Failures in Three Westminster Countries

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Abstract

This article examines selected print media coverage of a domestic natural disaster and domestic industrial failure in each of three Westminster countries: Australia, Canada, and the United Kingdom. It studies this coverage from several perspectives: the volume of coverage; the rate at which the articles were published; the tone of the headlines; and a content analysis of the perceived performance of key public and private institutions during and following the events. Its initial findings reveal that the natural disasters received more coverage than the industrial failures in each of the newspapers considered. There was also no significant difference in the publication rate across event type or newspaper. In each case, government was assessed at least as frequently and negatively as non-government actors, particularly during and following industrial failures. The manner in which government and non-government actors were assessed following these events suggests that, contrary to government claims that owners and operators of critical infrastructure (CI) are responsible for its successful operation, government in fact is "in the frame" as frequently as the industry owners and operators are. In addition, the negative assessments of governments following industrial failures in particular may prompt over-reaction by policy makers to industrial failures and under-reaction to natural disasters. This inconsistency is indeed ironic because the latter occur more often and cost more, both financially and socially. We reviewed 340 newspaper articles from three different newspapers: The Australian's coverage of the Canberra bushfires and the Waterfall train accident, The Globe and Mail's (Canada) coverage of Hurricane Juan and the de la Concorde overpass collapse, and The Daily Telegraph's (United Kingdom) coverage of the 2007 floods and the Potters Bar train wreck. Our sample size is small; our ability to compare across newspapers and countries limited. Further research is warranted.

KEYWORDS: media coverage, natural disasters, industrial failures, government performance

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1. INTRODUCTION

The 2011 tsunami in Japan shows us just how fickle media coverage is during major disasters that cause critical infrastructure (CI) failures: initially the media coverage was ripe with sympathetic depictions of devastated communities, but then it changed to something more sinister once the nuclear power plants became susceptible to failure. The story shifted from one of vulnerable and unlucky populations to one of poor industry performance and lack of government accountability and transparency.

The shift in the tone and focus of the coverage is important because who and what is being blamed changes and, in so doing, suggests to policy makers different types of corrective action. The purpose of this article is to examine more fully the distinction between media coverage of natural disasters and industrial failures. It is often taken for granted, for instance, that media amplify and attenuate certain risks, thereby influencing public (and by extension policy) debate (Kasperson et al. 1998; Pidgeon 1997). Yet what aspect of media coverage is most influential after failures in critical infrastructure? Many have argued that the volume of coverage reflects the flavor of public debate (Gaskell et al. 1999; Hood et al. 2001; Leahy and Mazur 1980). More recent contributions in the field suggest, however, that volume of coverage alone is inadequate (Quigley 2005; Rowe, Frewer and Sjoberg 2000).

This article begins with an examination of selected print media coverage of a domestic natural disaster and a domestic industrial failure in each of three countries. It looks at The Australian's coverage of the Canberra bushfires and the Waterfall train accident; The Globe and Mail's coverage of Hurricane Juan and the de la Concorde overpass collapse; and The Daily Telegraph's coverage of the 2007 floods in the U.K. and the Potters Bar train accident. The natural disasters are all typical of their regions (fire, hurricane, and flood), and the industrial failures are all drawn from the transportation sector. Media coverage was reviewed from the following perspectives: the volume of coverage; the rate at which the articles were published; the tone of the headlines; and a content analysis of the perceived performance of key public and private institutions during and following the events.

This last point in particular—the performance assessment of key public and private institutions—can shed light on an important dilemma that many Western countries face. In most Western governments' CI plans, governments stress that the owners and operators of CI—largely in the private sector—are responsible for managing their own critical assets.[1] At the same time, citizens look to government to respond during crises.

As we will see, each of the newspapers gave more coverage to the natural disasters than to the industrial failures, yet the industrial failures received more alarming coverage. Moreover, government and industry were assessed generally more negatively following the industrial failures than they were after the natural disasters. This pattern suggests that policy makers may be more likely to react more strongly in the aftermath of industrial failures than natural disasters despite the fact that natural disasters occur more frequently and usually cost more economically and socially.[2]

We selected events from different countries partly because we obtained the data from a larger project that we are conducting on critical infrastructure protection in Australia, Canada, the U.K., and the U.S., arguably the countries with the most advanced CI policy regimes post-9/11. As a result of this project, it might be possible over time to develop generalizable claims across the countries examined. This article, however, is much more modest. It will compare how a domestic natural disaster and industrial failure are covered by a leading domestic newspaper in Australia, Canada, and the United Kingdom, all Westminster governments. There are indications that further comparative research across countries may prove fruitful. For the moment, however, this article will refrain from generalizing on such a small sample size.

2. LEARNING ABOUT DISASTERS FROM THE MEDIA

Judging the performance of public and private sector owners, operators, and regulators of critical infrastructure by the manner in which they are depicted in the media presents particular challenges. Researchers have noted the media's propensity to report the dramatic over the common but more dangerous (Soumerai, Ross-Degnan and Kahn 1992), their tendency not only to

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[2] For example, see Public Safety Canada's Canadian Disaster Database, the International Disaster Database at the Université catholique de Louvain or the Attorney General of Australia's Emergency Management Australia Disasters Database. The Canadian Disaster Database, for instance, reports that natural disasters occur 40 times more frequently in Canada than conflict disasters. This ratio has been (relatively) stable for over forty years.

sensationalize (Johnson and Cavello' 1987), but also to sensationalize the most negative aspects of events, in particular (Wahlberg and Sjoberg 2000). While CI failures are sensational and lend themselves to this type of coverage, it is not clear whether the events receive the coverage that they do because of their dramatic nature or rather because they reflect the sustained concerns of civil society.

Moreover, researchers have also been careful to note that there is no "one view" about risks among the public who consume and respond to these media articles. Risk perception is mediated through social context (Alaszewski 2005; Boholm 2009; Frewer 2004; Slovic et al. 2004). It has been argued that risk perception among populations varies by gender (Drottz-Sjoberg 1991), education (Kraus, Malmfors and Slovic 2001; Rundmo 1999), degree of expertise in the subject matter (Brun 1994; Slovic 1987) as well as a variety of emotive factors (Baron, Hershey and Kunreuther 2000; Rundmo and Moen 2006). Therefore what one might consider important, newsworthy or even dangerous and alarming is subject to interpretation.

Mutz and Soss (1997) note that the media raise people's perceptions of the salience of a subject in the community but are much less successful in changing people's minds on a particular subject. Similarly, Atwood and Major (2000) note that people do not think of themselves as being as vulnerable to risks. Indeed, some suffer from cognitive dissonance; they are unrealistically optimistic, ignoring the news and denying personal vulnerability. It has also been argued that research tends to focus on print media when in fact most receive their news from television and radio (Cottle 2000). The rising prominence of social media makes this dilemma even more problematic (Hughes and Pelan 2010).

Nevertheless, an examination of print media coverage of CI failures offers some important insights. First, notwithstanding the fact that individual perception may vary, researchers have noted that many people base their perceptions of risk primarily on information presented in the media (Fischhoff 1985, 1995; Kitzinger and Reilly 1997). Hood et al. argue that high-circulation newspapers do not necessarily reflect public opinion, but they do assume that they reflect "the flavour of the public debate, not least because opinion leaders read such sources" (2001, 93). Hood et al. draw on Gaskell et al. (1999) for this analysis. Gaskell and colleagues concluded that increasing amounts of coverage of technological controversies were associated with negative public perceptions (1999, 385), or what is referred to as Quantity of Coverage Theory (Leahy and Mazur 1980). Print media also have the advantage of being stable documents that are updated usually every 24 hours. So, while the researcher may not be able to monitor how the story changes by the minute, as one might be able to do by researching television or social media, the researcher can monitor the progress of the story on a 24-hour basis, in the same way that one might research television or social media stories at 24-hour intervals. Looking at the daily paper also has the advantage of viewing a

source that has eliminated the many errors in reporting that happen throughout the day during a CI event and can run amok on social media, for instance.

Contrary to Hood et al.'s claim that volume of coverage alone is an indicator of the views of civil society, there is reason to believe that a more nuanced reading of media coverage is required. Quigley (2005, 2008) showed that, in the case of Y2K media coverage, volume of coverage alone was misleading; tone and content analysis provided a much closer read of civil society's view of the issue. Similarly, media analysis of coverage of Hurricane Katrina found that the story placement and the tone of media coverage had an impact on the force of government reaction (Barnes et al. 2008). Moeller (2006) distinguishes between "simple" emergencies, in which answers appear to be straightforward, and "complex" emergencies that require more political and social attention. Natural disasters, characterized as "simple" emergencies, receive more media coverage because the events are dramatic, but they also require relatively less research and background knowledge; cause and effect relationships are perceived to be straightforward or, at a minimum, beyond our control. In contrast, industrial failures are characterized as "complex" emergencies; they receive less media attention because they require significantly more media resources and are not as easy to explain (Moeller 2006).

This is not to suggest that less coverage means less concern. Ironically, at times, the opposite may be true. For example, while responses to hurricanes are often ad hoc and reflect on "social problems retrospectively while rarely if ever dealing prospectively with future disasters" (Barnes et al. 2008, 609), the coverage of industrial failures , which tends to be lighter in volume, seeks more often to assign blame. Pidgeon argues that "despite the inherent complexity and ambiguity of the environments within which large-scale hazards arise, and the systemic nature of breakdowns in safety, cultural myths of control over affairs ensures that a culprit must be found after a disaster or crisis has unfolded" (1997, 9).

Recent literature has identified several important research opportunities in this field. Bakir (2010) calls for an analysis of the responsiveness of private and public institutions to different types of risks. As many Western countries rely heavily on both private and public sector actors to provide critical services, the examination of emergency response must include both. A comparative approach across countries also has particular advantages. First, it allows us to increase the number of cases for study, as CI failures within one country alone are rare. Second, while CI failures seem unique, an examination of media coverage allows us to determine if indeed there are patterns of coverage after these events that may predict media coverage for future events. At six cases and three countries, our sample size is small. With this in mind, we propose a modest contribution to these important questions. This article will look at how one newspaper in each

country examined a domestic natural disaster and industrial failure, and will raise some questions for further investigation with respect to cross-national comparison. For the methodological reasons noted below, it will refrain from going beyond that.

3. METHODOLOGY

The key research questions for this paper are as follows:

- In which ways does print media coverage of natural disasters differ from print media coverage of industrial failures?

- Following an event, in which ways does media assessment of government performance differ from media performance assessment of key owners and operators of CI?

- Finally, what are the potential implications of this media coverage for public policy?

3.1. Case Selection

We analyzed one domestic high-profile natural disaster and one domestic industrial failure in each of Australia, Canada, and the United Kingdom (U.K.) (see Table 1), all of which are large, Western countries with similar governance structures.[3] Their CI is owned and operated by a mix of public and private sector actors. Each government has stated clearly that owners and operators of CI are responsible for the critical assets they own.[4]

[3]All three countries derive their governance arrangements from the Westminster tradition. Canada and Australia are federal systems. The United Kingdom is traditionally described as a unitary state, though devolution introduced a degree of decentralization that is similar to a federation.

[4] For Australia, see Australian Government, Attorney General's Department (2011); for Canada, see Canada, Public Safety Canada (2011); for the U.K., see Centre for the Protection of National Infrastructure (2011).

Table 1: Events Selected

Natural Disaster				Industrial Failure			
Event	Cost	Duration (Date)	# of deaths	Event	Cost	Date	# of deaths
Canberra bushfires[5] (Australia)	AUD $300 million (USD $305.3 million)	10 days (8-18 January 2003)	4	Waterfall train accident[6] (Australia)	n/a	31 January 2003	7
Hurricane Juan[7] (Canada)	CAD $113 million (USD $110.5 million)	5 days (24-29 September 2003 / 1 day on land)	8	de la Concorde overpass[8] collapse (Canada)	n/a	30 September 2006	5
2007 flooding (U.K.)[9]	GBP £3 billion (USD $4.7 billion)	55 days (1 June 1–25 July 2007)	13	Potters Bar rail accident[10] (U.K.)	n/a	10 May 2002	7

[5] McLeod (2003)
[6] McInerney (2005)
[7] CBC News (2005)
[8] Johnson, Couture and Nicolet (2007)
[9] United Kingdom, Cabinet Office (2008)
[10] United Kingdom, Heath and Safety Executive (2002)

We selected events that were extreme examples of typical natural disasters for each region—flooding in the U.K., hurricanes in Nova Scotia, and bushfires in New South Wales. While there is some variation across the events, these examples received more newspaper media coverage than any other domestic natural disaster during the year in which they occurred. These events also caused significant loss, measured both in dollars and in human casualties. (We acknowledge, however, that the U.K. flooding deviates from the other examples: it lasted longer, cost more, and affected more land mass than the others. This variation constrains the comparison, in volume of coverage in particular.)

For the industrial failures, three transportation events, each affecting a common form of transportation in the three countries, were selected. In order to control further extraneous variables, industrial failures in the same sector were chosen. The costs of these events have not yet been estimated and may never be. The three events had a similar number of fatalities. All events—natural and industrial—occurred after 9/11.

3.2. Media Analysis

We selected The Australian (Australia), The Daily Telegraph (U.K.) and The Globe and Mail (Canada) because they are the most highly distributed broadsheets in the countries in which they publish.[11] Using the Factiva database, we reviewed 340 newspaper articles in total.[12] We identified our sample by drawing on all articles that appeared over one year following the date on which each event began and which included the term(s) most commonly used to refer to the event. For example, in addition to the "De la Concorde Overpass Collapse," we used the terms "Montreal Bridge Collapse" or "Montreal Bridge." Articles that were clearly not principally about the event were eliminated. These types of events tended to appear in large numbers of articles during the year in which they occurred but the references to the events were often asides in articles that were principally about something else. In all cases we chose to examine articles that were first and foremost about the event in question.

For the analysis of the headlines, we drew on the analytical framework of Rowe, Frewer, and Sjoberg (2000), which examines not only volume but also

[11] The Daily Telegraph publishes seven days per week; the other two newspapers publish six days per week. For the purposes of this research, this difference only affects volume of coverage and performance assessment of government and industry.

[12] Local media coverage may well yield different results but they are not part of this research project.

media tone and content when considering how risks[13] are communicated to the public. Headlines were categorized in one of four ways: alarming; reassuring; alarming and reassuring; neither alarming nor reassuring. This article focuses only on the more extreme cases—alarming, and reassuring. It assumes that the two middle categories have a neutral effect. In order to reduce the impact of the bias, we assessed all of the articles during a short and fixed period of time (between February and March 2010). We also developed a standard template and applied it to all articles. All results were stored in an Access database that we developed and maintain, which includes media analysis of 25 CI events. One research assistant classified all articles in The Australian; one classified all articles in The Globe and Mail; and one classified all articles in The Daily Telegraph. While this approach provides some consistency to the analysis of industrial failures and natural disasters within each newspaper, it fails to offer the same level of consistency across newspapers. The group did meet initially, however, to review articles together in order to introduce some level of consistency. The group also met occasionally throughout the two month assessment period to discuss the review process. Finally, to test the inter-rater reliability of coding for all 25 events in the database, ten percent (n = 186) of the 1857 articles in the database were double coded independently of the original coders. Using Cohen's kappa coefficient, we found an inter-rater reliability agreement of k = 0.80 for tone of the headlines, and k = 0.66 for government performance assessment. This corresponds to a substantial level of agreement.

A few methodological constraints on the headline content analysis bear noting. First, what constitutes "alarming" is often in the eye of the beholder. In general, we judged headlines to be alarming when they used dramatic language and implied the potential for a negative outcome or that the event and the consequences were "out of control." As best as possible, we tried to wear the hat of the newspapers' (relatively broad) target audience and not that of an expert. While there were some difficult judgments, most headlines were categorized easily. Second, headlines are dramatic. Though a headline may be alarming, it does not follow that the entire article will be so.

For analysis of the content of the articles, we determined whether key actors, such as government and owners and operators in CI sectors, were assessed positively, negatively or neutrally (N/A was also an option). To summarize the performance data, a value of + 1 was assigned to each article that provided, on balance, a positive assessment of each key public or private CI entity; a value of -1 was assigned to each article that was negative (neutral assessments were given a rating of 0). We then calculated the total net sum, adding the number of positive

[13] Rowe, Frewer, and Sjoberg examine how science and technology risks are communicated to the public.

and negative assessments. We also present the data as a ratio (negative to positive assessments).

4. MEDIA ANALYSIS

4.1. Volume

The natural disasters examined received considerably more coverage than the industrial failures. As observed in Table 2 below, The Australian featured 46 articles on the Canberra bushfires while only 26 articles on the Waterfall train accident. The Globe and Mail featured 44 articles on Hurricane Juan and 27 articles on the de la Concorde overpass collapse. The Daily Telegraph had a significantly higher number of articles by event type than the other two newspapers: it featured 151 articles on the U.K. flooding and 44 articles on the Potters Bar train accident. While there is strong evidence of a difference in volume of coverage[14] the differences in the ratios of front-page to non-front-page articles are not significant. This is true in comparing all six events or if aggregated to compare natural disaster with industrial failure. For instance, 7.2% of the industrial failure articles appear on the front page compared with 9.1% of the articles about the natural disasters.

Table 2: Volume of Coverage of Natural Disasters Versus Industrial Failures

Event	Number of Articles	Front Page Coverage
Natural Disasters		
Canberra bushfires	46	2
Hurricane Juan	46	5
U.K. flooding	151	15
Industrial Failures		
Waterfall train accident	26	0
de la Concorde overpass collapse	27	3
Potters Bar rail accident	44	4

In sum, our initial findings do not challenge existing research: the natural disasters received more coverage than the industrial failures. However, the ratio of front-page to non-front-page articles is similar across all events, which suggests

[14]Using a one-sided Mann-Whitney Test for comparing these samples resulted in an exact p value of 0.05.

that the difference between coverage may be in scaling only, and that volume is the key explanatory variable.

4.2. Publication Rate of Articles

We investigated the distribution of articles over time, such that we controlled for the volume of coverage and expressed the data in the form of the cumulative proportion of articles published. In addition to calculating the total number of articles for each individual event, we compared coverage by newspaper and by type of incident. There were remarkable similarities between the distribution of articles across many of these factors.

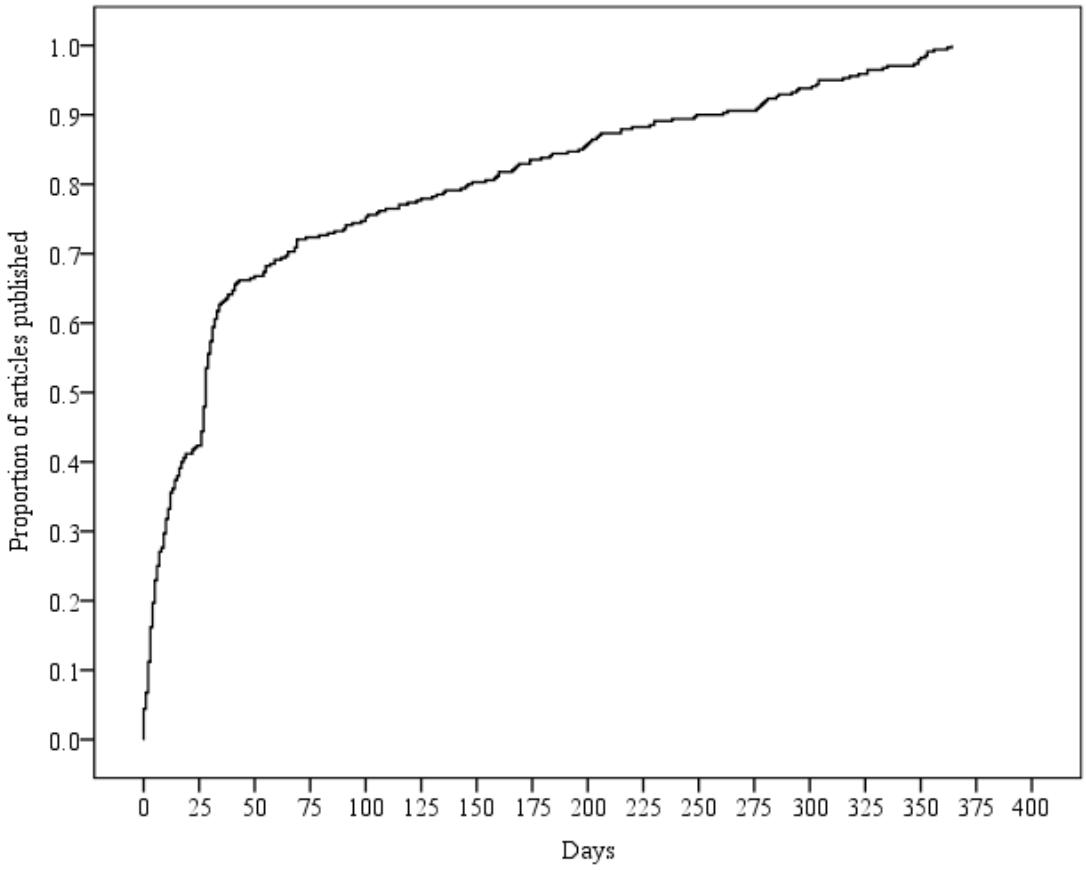

Figure 1. Cumulative Published Articles in Data Set over a One-Year Period

Sixty percent of the articles were published within the first 32 days following the event. Beyond this point the articles were published at a constant but much lower rate, as illustrated by the linear relationship in the plot (see Figure 1). The median, i.e., the number of days at which point half of the articles were published, was 28 days with a 95% confidence interval of (26.6, 29.4).[15] We also saw more agreement with these events in the first few weeks compared with half

[15] If we were to assume that the publication time of each article was independent and identically distributed we would obtain a 95% confidence interval about the median of (26.57, 29.42). The strength of such an assumption would rely in part on the similarities between the distributions for each event.

way through the year, at which point there was some deviation. Figure 2 illustrates the distribution of articles for each event.

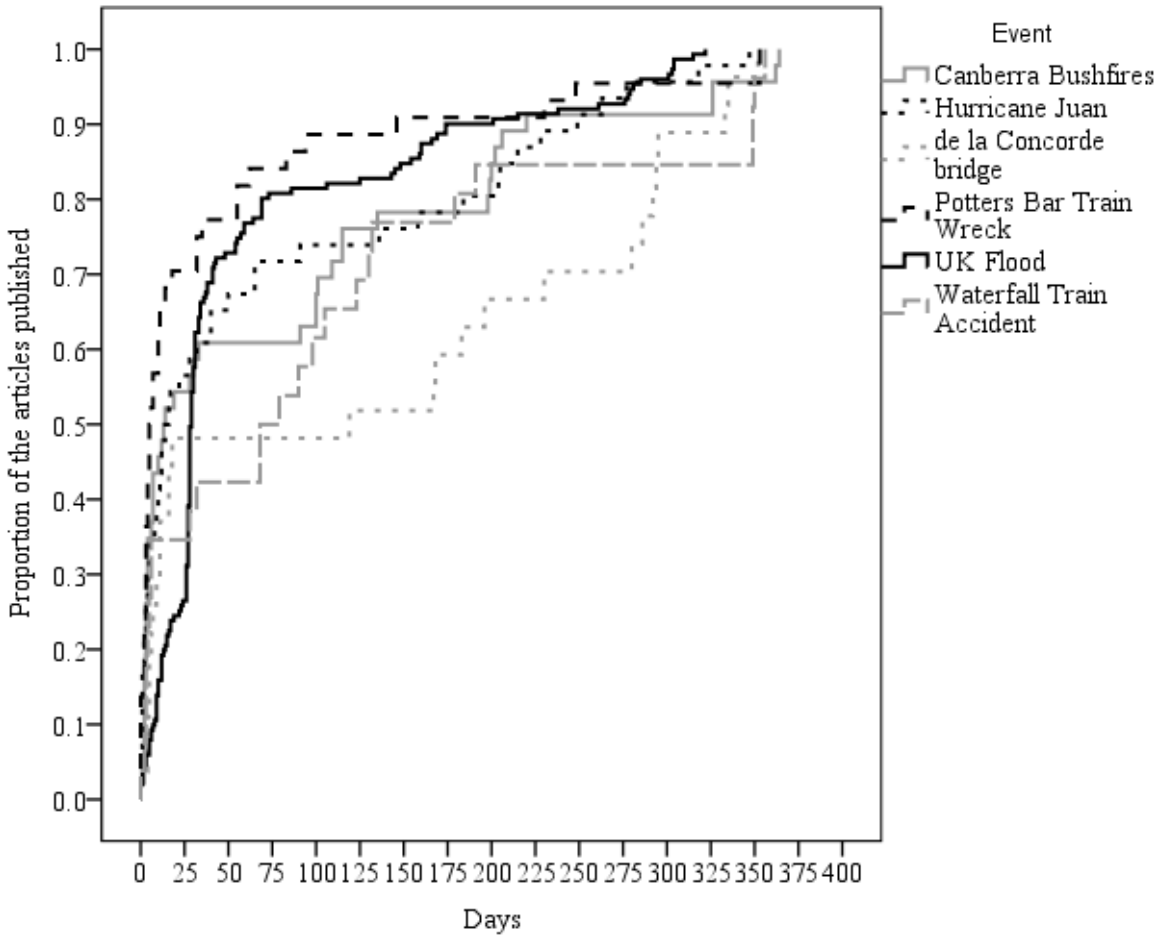

Figure 2. Comparison of Distribution of Articles by Event Shows More Similarity in Early Period than Mid Period

The rate of publication across all events was similar but not entirely consistent. We see from Figure 2 that Potters Bar had the greatest proportion of articles published in the days immediately following the event, while the de la Concorde overpass collapse had the greatest proportion published after 100 days. We used nonparametric tests[16] to assess if the observed differences in the data were systematic, i.e., if there were a similar systematic pattern to the publications,

[16] We used the Mann-Whitney U Test when comparing two sub-populations and the Kruskal-Wallis Test when comparing more than two (Conver 1999).

allowing the observed differences to be explained as random variation. The hypothesis that the six events were sampled from the same distribution was rejected at the 5% significance level. If we remove Potters Bar from the analysis the hypothesis is not rejected, which is to say that there is similarity in the publication rates across five of the six events. Grouping the events by newspaper, again, we see similar but not identical patterns. Figure 3 illustrates the distributions aggregated by newspaper. These distributions are not significantly different.[17]

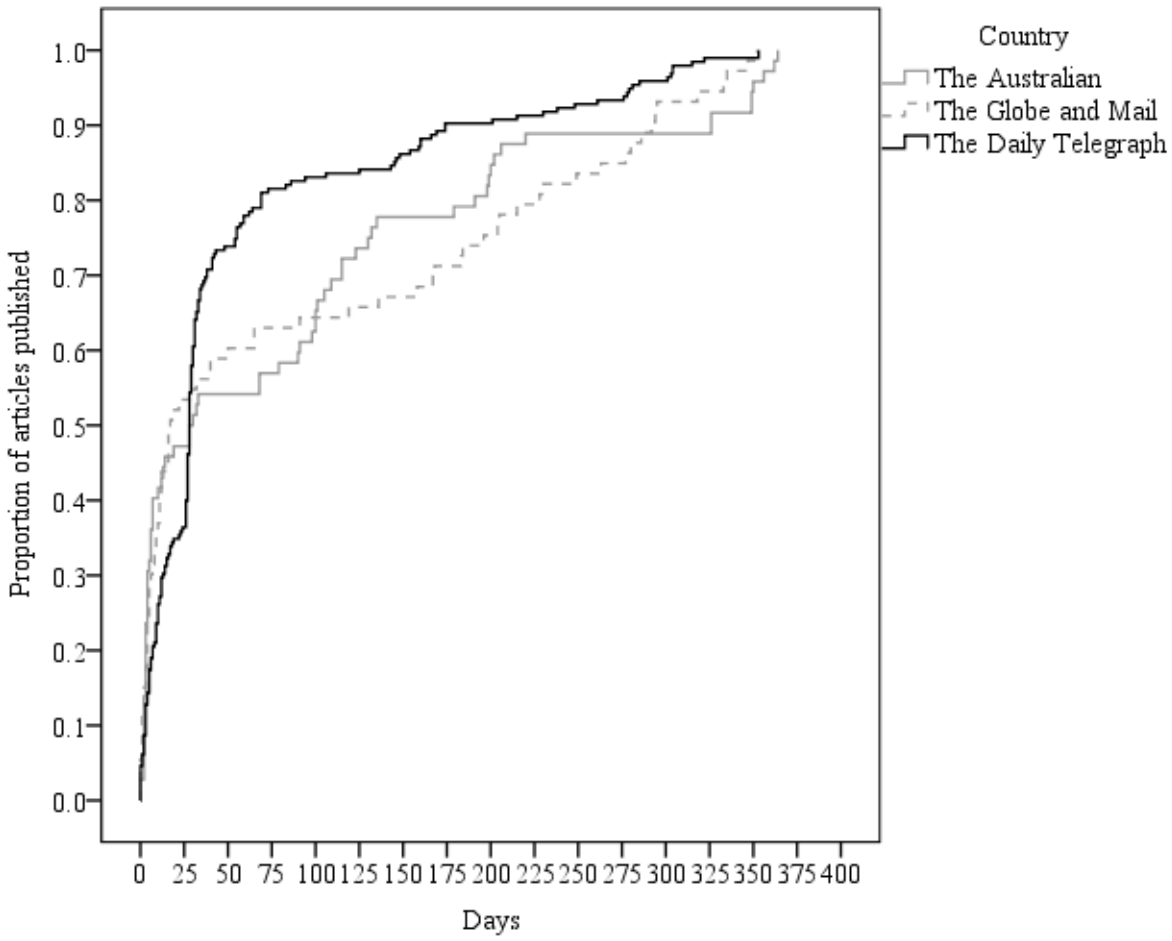

Figure 3. Distribution of Articles by Country is Not Significantly Different

[17]Using the Kruskal-Wallis Test, the hypothesis that the three distributions in Figure 3 are sampled from the same distribution resulted in a significance value of 0.966 and thus would not be rejected at the 5% level.

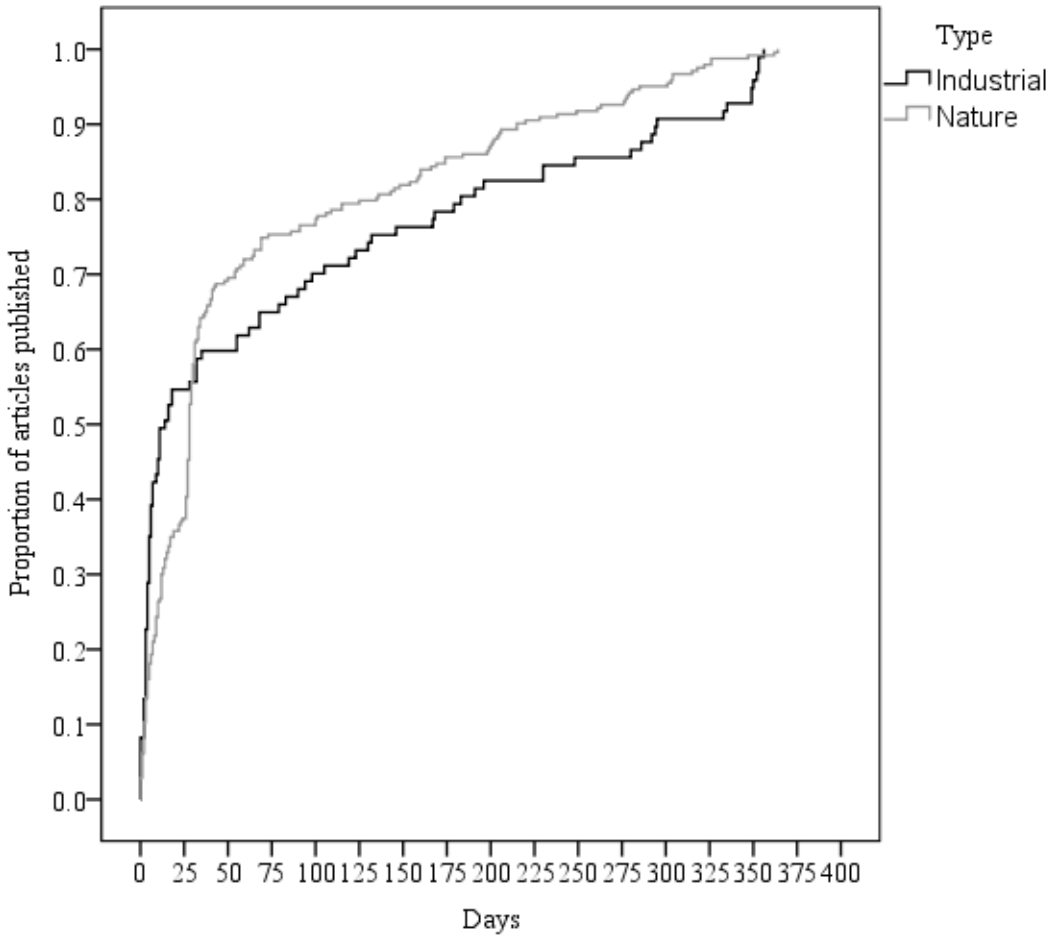

Figure 4. Distribution of Articles by Event Type is Not Significantly Different

There was also little to distinguish between industrial failures and natural disasters. Figure 4 combines the data to illustrate the distributions by type of event. The differences between the distributions were not significant.[18] As such

[18]Using the Mann-Whitney U Test to assess the difference in the distributions between event types we obtained a significance value of 0.298 so the null hypothesis that the two distributions have the same underlying distribution would not be rejected at the 5% level.

there is no evidence that the publication rate is systematically different by event type.

In sum, when we considered the time patterns of coverage and controlled for volume, we observed little to distinguish the events either by type or by newspaper.

4.3. Tone of Headlines

We calculated the number of articles with an alarming headline as a percentage of those that were either alarming or reassuring. These results are summarized in Table 3. The Globe and Mail had the smallest percentage in both natural disasters and industrial failures, with 69.4% and 75.0% respectively, while The Daily Telegraph had the highest in both, with 90.3% and 96.6% respectively. For each newspaper the percentage of alarming headlines is approximately 6.0 percentage points higher for industrial failures than for natural disasters.

Table 3: Tone of Headlines about Natural Disasters and Industrial Failures

Event	Number of Alarming Headlines	Number of Reassuring Headlines	Percentage of Alarming Headlines
Natural Disasters			
Canberra bushfires (The Australian)	22	8	73.3%
Hurricane Juan (The Globe and Mail)	25	11	69.4%
U.K. flooding (The Daily Telegraph)	93	10	90.3%
Industrial Failures			
Waterfall train accident (The Australian)	11	3	78.6%
de la Concorde overpass collapse (The Globe and Mail)	15	5	75.0%
Potters Bar rail accident (The Daily Telegraph)	28	1	96.6%

4.4. Performance Assessment: Government

Next we examined how the media articles assessed government performance. Each article was assigned to one of four categories: no comment, negative assessment, neutral assessment or positive assessment. For the most part, the performance assessments referred to the order of government that was primarily responsible for regulating the sector in question. The provincial government regulates bridges in the province of Quebec, for instance, and as result the provincial government received the most performance assessments. That noted, we did count all performance assessments of all orders of government, as shown in Table 4.

The industrial failures generally generated more negative performance assessments of government than did the natural disasters. There is a wide range of performance assessment results for natural disasters. The Globe and Mail published positive assessments of how government performed during Hurricane Juan and negative performance assessments of how government performed during the de la Concorde overpass collapse. The Australian had (on balance) marginally negative assessments of government during the Canberra bushfires and much more negative assessments of government in articles about the Waterfall train accident. The Daily Telegraph gave negative performance assessments of government in articles about both the 2007 floods and the Potters Bar train wreck.

Table 4: Performance Assessment Summary for Each Order of Government – Natural Disasters[19]

Event	Central/Federal Difference (Positive – Negative)	Ratio of Negative to Positive Assessments	Provincial Difference (Positive – Negative)	Ratio of Negative to Positive Assessments	Municipal Difference (Positive – Negative)	Ratio of Negative to Positive Assessments
Canberra bushfires	(4-9) = -5	2.5:1	(1-0) = 1	0:1	(2-2) = 0	1:1
Hurricane Juan	(5-3) = 2	0.6:1	(11-3) = 8	0.27:1	(9-0) = 6	0:9.0
U.K. flooding	(7-66) = -59	9.4:1	N/A	N/A	(3-7) = -4	2.3:1

Table V: Performance Assessment Summary for Each Order of Government – Industrial Failures

Event	Central/Federal Difference (Positive – Negative)	Ratio of Negative to Positive Assessments	Provincial Difference (Positive – Negative)	Ratio of Negative to Positive Assessments	Municipal Net Difference	Ratio of Negative to Positive Assessments
Waterfall train accident	N/A	N/A	(0-8) = -8	8:0	N/A	N/A
de la Concorde overpass collapse	N/A	N/A	(1-14) = -13	14:1	N/A	N/A
Potters Bar rail accident	(1-14) = -13	14:1	N/A	N/A	N/A	N/A

[19] A 0 indicates that there were no counts of performance assessment.

4.5. Performance Assessment: Key Sectors

When referring to key sectors, this article relies on Public Safety Canada's list of critical sectors. Different countries have slightly different lists: Public Safety Canada has identified ten sectors; the U.K.'s Centre for the Protection of National Infrastructure (CPNI) has identified nine; Australia's Trusted Information Sharing Network (TISN) has identified seven. The countries' lists are similar, and include sectors like finance, water, food, power supply, health, transportation. For the purposes of this analysis, "government" refers to government departments and agencies. In other words, it would include a department of health but not hospitals. Hospitals would fall under the key sector "health." Similarly, "emergency services" refers to police, fire, military, and ambulance, and is treated as a key sector. The transportation sector refers to private industry, such as road or rail construction companies. Transportation regulators, however, would fall under government.

The articles about natural disasters included performance assessments of several key sectors although there were few articles about any one key sector. Most of the performance assessments were positive. Emergency services were referred to most often, and the assessments were almost entirely positive. The health sector and the electricity sector received the second highest number of assessments, and, again, the assessments were almost always positive. Some sectors received a slightly negative assessment: the finance sector in The Globe and Mail's coverage of Hurricane Juan, and the IT and communications sector in The Australian's coverage of the Canberra bushfires. There were, however, few articles in total. The only sector that received a somewhat stronger negative performance assessment was the water sector in The Daily Telegraph's coverage of the floods.

Among the industrial failures, fewer sectors were assessed. Of those assessments, few were entirely positive, including assessments of emergency services. Indeed, the transportation sector was assessed negatively in almost all cases (see Appendix A for the assessments).

The publication rate at which key sectors are assessed positively is largely the same as the publication rate of negative assessments for industrial failures but not for natural disasters. Figure 5 provides box plots to compare the distribution of the articles for each category of assessment of key sectors partitioned also into event types. Displayed on the box plot are the minimum, first quartile, median, third quartile, and maximum. Figure 5 also highlights outliers with circles, and extreme outliers with stars. For example, we see that the first article covering an industrial event, which negatively assessed industry, appeared on day 0; the last one appeared on day 353. Twenty percent of the articles on industrial failures that assessed industry negatively were published by day three; 50% by day 14; and

75% by day 140. In contrast, articles about natural disasters, which assessed industry negatively, followed a different pattern: the first article was published on day 36; the last one was published on day 250. Twenty-five percent of these articles were published by day 40; 50% by day 130; and 75% by day 193.

There is no evidence of a systematic difference in publication rate of negative or positive assessments throughout the year except in the case of natural disasters, where a delay in negative assessments of industry was observed.[20]

[20]Using a Kruskal-Wallis Test, we obtained a significance test statistic of 0.004, thus a statistically significant difference at the 1% significance level.

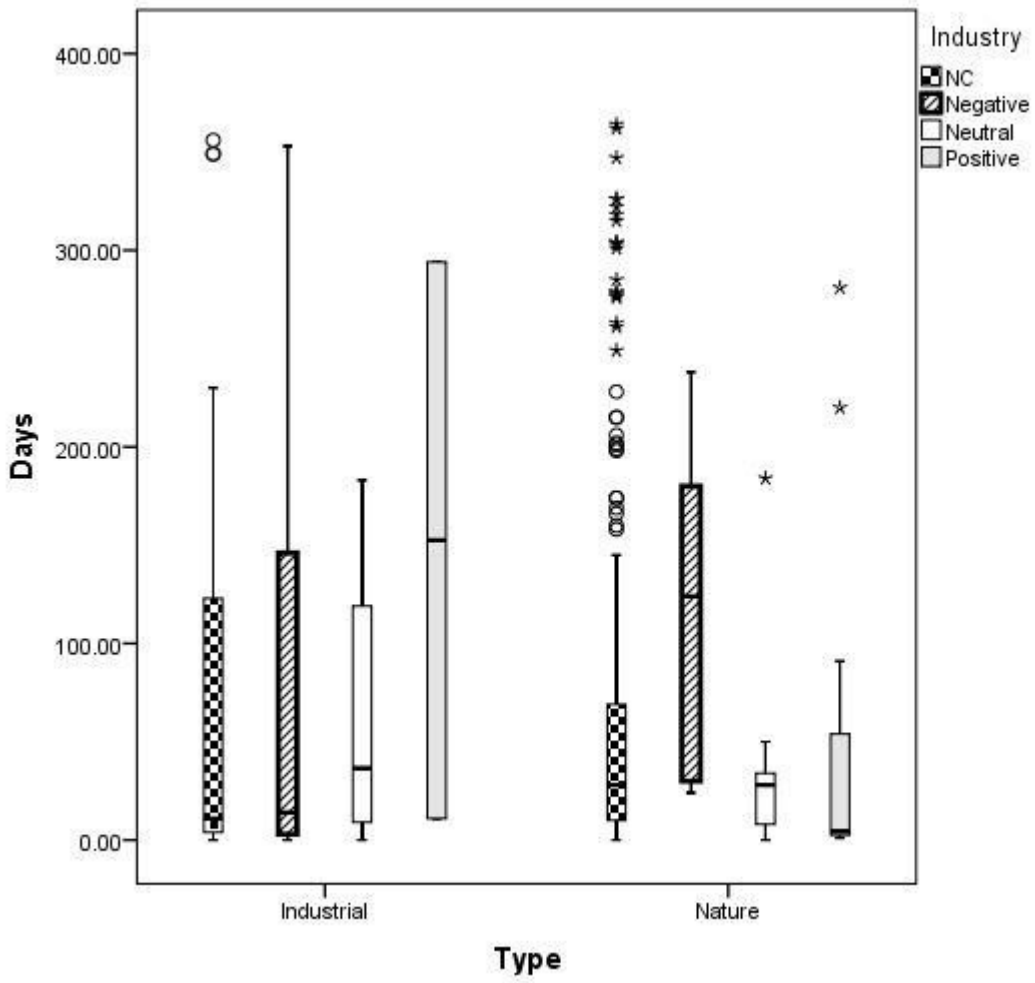

Figure 5. Box Plot Illustrating the Distribution of Articles Assessing the Performance of Industry for Two Types of Incidents With Only Nature Having Statistically Significant Differences

5. CONCLUSION

In many Western governments' CI plans, governments stress that the owners and operators of CI—largely in the private sector—are responsible for managing their own critical assets.[21] Yet, despite government policy claims that individual owners and

[21]For the U.S., see United States, Department of Homeland Security (2008); for the U.K., see Centre for the Protection of National Infrastructure (2011); for Australia, see Australian

operators are responsible for their own critical assets, government performance is very much "in the frame" during and after these events, and attention cannot be easily shifted solely to the CI owners and operators.

This article used a small sample of events and must, therefore, be cautious in any generalizations made. Cross-national comparisons, in particular, are limited because we only used one newspaper in each country and, despite some effort to approach the analysis in a uniform manner, research assistants were each assigned a newspaper. Consequently, comparisons across newspapers are subject to the inconsistencies inherent in such a method. Nevertheless, each newspaper followed (at times remarkably) similar patterns: natural disasters received more coverage than the industrial failures; the publication rate across all events was largely similar; industrial failures received more alarming coverage than natural disasters; and performance assessments of government and industry following the industrial failures was uniformly negative. Following natural disasters, performance assessment was somewhat mixed, and at times positive.

Among the cases selected, the 2007 flooding in the United Kingdom stands out as a much larger event. The floods lasted longer and cost considerably more. There was a much higher volume of coverage compared to the other two natural disasters and, as a result, a much larger number of performance assessments of government. The floods also occurred at a politically volatile time. Gordon Brown had just become prime minister following Tony Blair's resignation; Brown's executive did not have a new mandate to govern, which is legally acceptable but politically difficult. As has been noted about Hurricane Katrina, major CI events can be amplified even more if there are underlying political tensions (Barnes et al. 2008). Notwithstanding this variation, The Daily Telegraph still followed many of the same patterns as the other newspapers with respect to natural disasters and industrial failures.

Future research will attempt to overcome some of the initial methodological constraints. We will, for example, increase the number of cases studied. As noted, our database currently has 25 different CI events, which create further opportunities for analysis. We would also like to expand the number of newspaper sources. Newspapers can include ideological biases that lead to negative assessments of particular governments. Increasing the number of newspapers and drawing from a wider range across the ideological spectrum will help to offset the bias. One specific challenge rests in identifying similar types of events. These events (thankfully) tend to be rare; finding a perfect match for comparison among countries is difficult. As noted above, the U.K. flooding had a much larger scope. In order to address this issue, we have conducted a similar

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Government, Attorney General's Department (2011); for Canada, see Canada, Public Safety Canada (2011).

analysis of the 2009 H1N1 pandemic (Quigley, Quigley and Pond 2012), which ostensibly offers an opportunity to examine an event of a much similar scale that occurred at the same time in each of the countries. The H1N1 pandemic generated 1199 articles, which is considerably higher than the number of articles analyzed here; the higher number makes generalizations more reliable.

Further research in this area is warranted because it can provide important insights into the contextual pressures that are applied to government policy makers following CI failures and, thus, the policy challenges that governments face in responding appropriately to such high profile, low probability/high consequence risks. The cases examined here suggest that government performance will be scrutinized differently following industrial failures and natural disasters. This finding may seem unsurprising but it contradicts government claims that the owners and operators are responsible for CI no matter what the event. Governments are often reluctant to dictate specifically how industry should protect its infrastructure, not only because government does not want to interfere with market processes, but also because government may not wish to take on problems that are better placed with the owners and operators of the infrastructure. As we saw in the BP Deepwater Horizon Oil Spill in the Gulf, however, even events that start off (ostensibly) as private industry's responsibility will eventually draw in the government. It is only a matter of time before commentators start asking about the role of the regulators, and whether or not they were corrupt, incompetent or just unlucky prior to the disaster. Moreover, the industrial failures examined here generated a demand for accountability from government that the natural disasters did not. The search for accountability seems more focused with industrial failures. This observation reinforces the adage that, if you build it, you maintain it. In this sense, industrial failures could potentially generate more political anxiety and, in so doing, disproportionate responses from politicians who are sensitive to political backlash. In Canada, for example, the de la Concorde overpass collapse prompted a public inquiry and an extensive review of bridges in the province, whereas Hurricane Juan failed to warrant a public inquiry despite the considerable social and economic cost of the disaster.

This inconsistency is ironic. The natural disasters studied cost more and affected more people than did the industrial failures. The comparatively positive (or less negative) coverage that government agencies received during natural disasters potentially limited institutional learning. As Steinberg (2000) notes, there are several political and budgetary decisions that are taken well in advance of any natural disaster, which have significant impact on our collective ability to respond effectively to disasters, including where and to what standard we should build. If media coverage of these natural disasters continues to be snap-shot and episodic, focusing largely on survival in the face of "Acts of God," and positive assessments of emergency services with few (and delayed) negative assessments

of key sectors, it potentially undermines our capacity to reflect more seriously on the funding and political decisions that were taken prior to these events yet have potentially serious implications for their outcomes.

Equally disconcerting is the fact that the events selected for this study are typical of the regions in which they took place. In other words, these events will likely happen again. Effective emergency response demands well-informed government, CI service providers, and public. It behooves the government to do its utmost to reflect more critically on its performance and allow citizens to reflect on the government's performance as well as the performance of the community as a whole. In so doing, governments together with citizens and key sectors can help to ensure that future economic and social losses are minimized.

Appendix A

Table A1: Performance Assessment of Key Sectors – Canberra Bushfires

Sector	**Number of Positive Assessments**	**Number of Negative Assessments**	**Net Difference**	**Ratio of Negative to Positive Assessments**
NFP Community (Emergency Response)*	4	0	4	0:4
Health Care	2	0	2	0:2
Electrical	2	0	2	0:2
Fire	1	0	1	0:1
Communications and IT	1	2		2:1
Police	1	0	1	0:1

*NFP: Not-for-Profit. This includes organizations such as the Red Cross.

Table A2: Performance Assessment by Key Sectors – Hurricane Juan

Sector	**Number of Positive Assessments**	**Number of Negative Assessments**	**Net Difference**	**Ratio of Negative to Positive Assessments**
NFP Community (Emergency	3	0	3	0:3

Response)				
Health Care	3	0	3	0:3
Electrical	3	1	2	1:3
Police	4	0	4	0:4
Fire	5	0	5	0:5
Ambulance	3	0	3	0:3
Military	6	2	6	1:3
Finance	1	2		2:1
Water	1	1		

Table A3: Performance Assessment by Key Sectors – U.K. Flooding

Sector	**Number of Positive Assessments**	**Number of Negative Assessments**	**Net Difference**	**Ratio of Negative to Positive Assessments**
NFP Community (Emergency Response)	9	0	9	0:9
Water	1	8	-7	8:1
Police	10	0	10	0:10
Fire	17	0	17	0:17
Ambulance	2	0	2	0:2
Military	6	0	6	0:6
Communications and IT		20	2	0:2

Table A4: Performance Assessment by Key Sectors – Waterfall Train Accident

Sector	Number of Positive Assessments	Number of Negative Assessments	Net Difference	Ratio of Negative to Positive Assessments
Transportation	0	8	-8	8:0
Communications and IT	0	1		1:0
Ambulance	1	1		
Judiciary	1	1		

Table A5: Performance Assessment by Key Sectors – De la Concorde Overpass Collapse

Sector	Number of Positive Assessments	Number of Negative Assessments	Net Difference	Ratio of Negative to Positive Assessments
Transportation	2	8	-6	4:1
Police	1			0:1
Manufacturing	1	1		1:1

Table A6: Performance Assessment by Key Sectors – Potters Bar Rail Accident

Sector	Number of Positive Assessments	Number of Negative Assessments	Net Difference	Ratio of Negative to Positive Assessments

Transportation	0	35	-35	35:0
Finance		2		2:0
Fire	1			0:1
Ambulance	1			0:1

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